



Docket No.: 696-260

AMENDMENTS TO THE DRAWINGS:

As requested by the Examiner, attached are 6 formal drawing Replacement Sheets.

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REMARKS

Reconsideration is respectfully requested.

1-2. In paragraphs 1 and 2 of the Office Action, the Examiner objected to the Abstract because it contains the phrase “the present invention discloses.” In response to this objection, a new Abstract deleting the phrase is submitted herewith on a separate sheet at Tab A.

3. In paragraph 3 of the Office Action, the Examiner objected to the drawings as being informal. In response, Formal Drawings are submitted herewith at Tab B.

4-5. In paragraphs 4-5 of the Office Action, the Examiner rejected claims 1, 2, 8-10, 15 and 16 under 35 U.S.C. § 102(b) as being anticipated by Nenstiel *et al.*, US 5,050,669 (“Nenstiel”). According to the Examiner, “Nenstiel *et al.* disclose (see Fig. 4(a)) a system (10) for stabilizing process tubes (12) including surrounding a portion of the tubes (12) with at least one apparatus having at least two rods (26) [referred to as ‘retaining means’ or ‘pins’], having at least two spacers (16) [referred to as ‘plates’] attached thereto, at least one rod retaining means on the rod (col. 4, lines 25-26), wherein the rods and spacers are comprised of temperature resistant material (col. 2, lines 67 and col. 3, lines 16 and 25-26), the tubes comprising reactor furnace tubes, . . . the tubes being straight and vertical (Fig. 1), the apparatus and tubes being constructed of a temperature resistant non-nickel containing material (col. 2, line 67 and col. 3, lines 16 and 25-26).”

Before addressing the specific merits of the rejection, Applicants believe a brief summary of the present invention would be helpful. The present claimed invention is not directed to supporting horizontal tubes in a convection type heat exchanger. In stark

contrast, the present invention is directed to improving the stability of already supported tubes in a radiant heat exchanger or furnace. What applicants had found was that supported tubes, especially serpentine shape or u-shaped tubes already supported in a radiant cracking furnace, suffered from problems due to tube movement from harmonics, fluid momentum, thermal expansion and/or other forces. This problem was known in the art as “swing” and caused problems such as tube or support-weld breakage and shadowing from the radiant heat source. The shadowing problem resulted in inconsistent heat transfer and coke formation. It was this problem of “swing” – not support – that the applicants’ present invention addressed and solved. See pp. 2 – 3 of specification.

Accordingly, it is respectfully submitted that Nenstiel does not anticipate the present invention for at least the following reasons. Nenstiel is directed to tube support and not solving the problem of swing in radiant heat exchangers and thus does not disclose the present claimed invention. First, Nenstiel does not disclose the claimed rod retaining means. That is, the retaining means (also referred to as “pins” in Nenstiel) recited at col. 4, lines 25-26, is the same structure, reference number 26, cited by the Examiner as being the rods. Thus, Nenstiel discloses only two structures: retaining means/pins (26) and plates (16). In contrast, the present invention utilizes rods (1), spacers (2) and rod retaining means (4).

In addition, Applicants have amended claim 1 to specify that the retaining means are removably attached to the rods and are located on at least one end of the rod for the purpose of retaining at least one spacer on the a rod. No new matter was added by the amendments. Support for the amendments may be found at least at Figs. 1A, 1B, 1C and

2 and in the specification at 10, lines 11-15. These amendments further distinguish the present invention from Nenstiel, which, in contrast, teaches welding many retaining means/pins to plates such that the retaining means/pins are between the tubes throughout the structure separating the tubes. This is because Nenstiel is directed to supporting tubes and not a system for reducing swing in already supported tubes.

The second reason that Nenstiel does not anticipate the present invention is that it does not disclose the claimed spacers. The plates (16) referred to by the Examiner as “spacers” run the length of the tubes not between the tubes. *See* Fig. 1. This would block the radiant heat from the burners, thus defeating the purpose of the invention. Thus, in contrast to Nenstiel, the claimed spacers are used to separate the tubes without running the length of the tubes. Applicants have amended claims 1 and 15 to specify further that location. No new matter was added by the amendments. Support for the amendments may be found at least at Figs. 2, 4 and 5 and in the specification at 10, lines 11-15. Further, the Nenstiel plates require many holes (Figs. 2, 3a and 3b), in staggered positions (Col. 3, lines 39-42), to achieve the function of the Nenstiel tube support whereas the present invention functions with only one opening on each spacer end to cooperate with the rods to achieve the result of reducing swing – not support. Finally, it cannot be said that the plates disclose the rods of the present invention because, *inter alia*, the rods of the present invention are rods with no openings and can be of any size whereas the plates of Nenstiel are square plates that cannot be inserted into holes in the pins.

The third reason that Nenstiel does not anticipate the present invention is that it does not disclose the claimed rods. The retaining means/pins (26) referred to by the Examiner

as “rods” are used to separate the tubes. *See* Fig. 1. In contrast, the claimed rods run along the sides of more than one tube, through openings 6 in the spacers, not between the tubes. *See, e.g.*, Fig. 4. Applicants have amended claims 1 and 15 to specify these features. No new matter was added by the amendments. Support for the amendments may be found at least Figs. 2, 4 and 5 and in the specification at 10, lines 11-15. Finally, it cannot be said that the pins disclose the spacers of the present invention because, *inter alia*, the pins have no openings for the insertion of the plates whereas the spacers of the present have openings for the insertion of the rods.

Accordingly, Applicants respectfully submit that this rejection is overcome as to independent claims 1 and 15 and dependent claims 2, 8-10 and 16.

6. In paragraph 6 of the Office Action, the Examiner rejected claims 1, 2, 4 and 6 under 35 U.S.C. § 102(b) as being anticipated by Fournier, US 4,589,618. According to the Examiner, Fournier “discloses a system (Fig. 6) for stabilizing process tubes (5) including surrounding a portion of the tubes (5) with at least one apparatus having at least two rods (6a [7a], 7b), having at least two spacers (19) attached thereto, at least one rod retaining means (21) on the rod (19), wherein the rods and the spacers are comprised of temperature resistant material . . . , the tubes (5) comprising furnace tubes, the tubes being u shaped or bent (see Fig. 1).”

It is respectfully submitted that Fournier does not anticipate the present invention for at least the following reasons. First, Fournier does not disclose the claimed rods. The sheet metal strips (17a and 17b) referred to by the Examiner as “rods” are undulating so as to grip the tubes. *See* Fig. 7. In contrast, the rods of the present invention are

substantially straight and Applicants have amended claim 1 to specify this feature. No new matter was added by the amendments. Support for the amendments may be found at least at Figs. 2, 4 and 5 and in the specification at 6, lines 10-14.

The second reason that Fournier does not anticipate the present invention is that it does not disclose the claimed rod retaining means. That is, the retaining means (21) identified by the Examiner (referred to as bolts in the reference (see Col. 3, lines 44-48) but apparently actually nuts or threaded hole in the strips (see Fig. 7)) are located throughout the strips and between the tubes. As noted above, Applicants have amended claim 1 to specify that the retaining means are located on at least one end of the rod to retain at least one spacer on one or more rods. This amendment further distinguishes the present invention from Fournier, which shows many bolts between the tubes throughout the structure so as to connect the strips.

The third reason that Fournier does not disclose the claimed invention is that it does not disclose spacers. That is, the spacers (19) identified by the Examiner (referred to as "bolts" (see Col. 3, lines 44-48)) are located throughout the strips and between the tubes. However, they do not separate the tubes. Instead they exert a clamping force on the strips and the tubes are separated by the convex undulations in the strips. Col. 3, lines 65-67. As noted above, Applicants have amended claim 1 to specify that the spacers serve to separate and stabilize the tubes to prevent swing and shadowing.

7-8. In paragraphs 7 and 8 of the Office Action, the Examiner rejected claim 3 under 35 U.S.C. § 103(a) as being unpatentable over Nenstiel in view of Kusters, US

4,889,182. According to the Examiner, Nenstiel discloses the claimed subject matter with the exception of the device being a pyrolysis furnace, which she finds in Weiss.

As explained above, Nenstiel does not teach or suggest the rods, spacers or retaining means of base claim 1. Because Kusters does not cure these deficiencies, claim 3 is not obvious in view of the references.

9. In paragraph 9 of the Office Action, the Examiner rejected claim 5 under 35 U.S.C. § 103(a) as being unpatentable over Nenstiel in view of Kritzer *et al.*, US 2,118,206 (“Kritzer”). According to the Examiner, Nenstiel discloses the claimed subject matter with the exception of serpentine tubes, which she finds in Kritzer.

As explained above, Nenstiel does not teach or suggest the rods, spacers or retaining means of base claim 1. Because Kritzer does not cure these deficiencies, claim 5 is not obvious in view of the references.

10. In paragraph 10 of the Office Action, the Examiner rejected claim 7 under 35 U.S.C. § 103(a) as being unpatentable over Nenstiel in view of Weiss *et al.*, US 4,834,173 (“Weiss”). According to the Examiner, Nenstiel discloses the claimed subject matter with the exception of swaged tubes, which she finds in Weiss.

As explained above, Nenstiel does not teach or suggest the rods, spacers or retaining means of base claim 1. Because Weiss does not cure these deficiencies, claim 7 is not obvious in view of the references.

11. In paragraph 11 of the Office Action, the Examiner rejected claims 11-13 and 17-19 under 35 U.S.C. § 103(a) as being unpatentable over Nenstiel in view of Hattori *et al.*, US 6,005,824 (“Hattori”). According to the Examiner, Nenstiel discloses the claimed

subject matter with the exception of constructing the tubes and tube supports of ceramic material, which she finds in Hattori.

As explained above, Nensteil does not teach or suggest the rods, spacers or retaining means of the claims from which the rejected claims depend. Because Hattori does not cure these deficiencies, claims 11-13 and 17-19 are not obvious in view of the references.

12. In paragraph 12 of the Office Action, the Examiner rejected claims 14 and 20 under 35 U.S.C. § 103(a) as being unpatentable over Nenstiel in view of Hattori and further in view of Yomamoto *et al.*, EP 1018563 (“Yomamoto”). According to the Examiner, Nenstiel in combination with Hattori disclose the claimed subject matter with the exception of constructing the apparatus of a ferrous alloy, which she finds in Yamamoto.

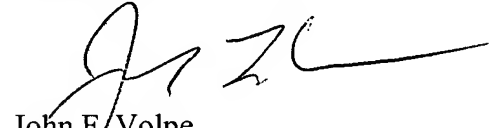
As explained above, Nensteil does not teach or suggest the rods, spacers or retaining means of the claimed subject matter and Hattori does not cure the deficiencies. Because Yomamoto does not cure these deficiencies, claims 14 and 20 are not obvious in view of the references.

13. In paragraph 13 of the Office Action, the Examiner made of record, but did not rely on, Kochey *et al.*, Meixl, Lecon, Meuschke *et al.*, Sabatino, and Moore to show tube supports. Applicants acknowledge such action.

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Based on the foregoing, early and favorable action is earnestly solicited.

Respectfully submitted,



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